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ABSTRACT

This report focuses on teaching with the World Wide Web. An introduction describes the Illinois State Board of Education's (ISBE's) efforts in urging local schools to integrate information technology into all aspects of their curriculum and in emphasizing the need for technology-focused staff development for Illinois teachers. ISBE supports Project Linc~On, a plan to install T1 lines and connect ports to every Illinois public school by the year 2000. Six anticipated benefits to Illinois schools from Project Linc~On are described, and other ISBE programs are listed that aim to improve schools' technological infrastructure, teacher skills, and long-range technology planning. Six essential standards for integrating information technology into classroom instruction are discussed, followed by a brief description of the World Wide Web and the educational potential of virtual learning communities. Eighty-four Web sites for K-12 educators are listed in 8 categories: general K-12 resources, state and federal education, science and mathematics resources, language arts resources, cultural and language resources, history and social science resources, museum sites on the Web, and schools on the Web. Seven strategies for teaching and learning on the Internet are noted, followed by nine guidelines for successful classroom instruction using the Internet. (TD)

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by Bruce O. Barker and Robert F. Hall [1]

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Teaching with the World Wide Web: Internet Resources for Educators in Illinois Schools

by Bruce O. Barker and Robert F. Hall [1]

Among technology-related initiatives forwarded by the Illinois State Board of Education (ISBE) in recent years, two trends stand out: (1) ISBE has increasingly urged local education units to integrate technology into all aspects of their school curriculum; and (2) ISBE has continued to emphasize the need for meaningful and sustained technology-focused staff development for Illinois teachers. Providing schools with ubiquitous access to technology resources, which includes high speed connectivity to the Internet, has been a major priority. ISBE supports Project Linc~On, a plan to incrementally create a statewide data network that connects a T1 line to every public school district in Illinois by the year 2000 and connecting ports into each public school building. Announced in 1996, ISBE's K-12 Information Technology Plan calls for universal, equitable, and affordable access to information age technologies to provide all Illinois teachers and students opportunities to engage in relevant and meaningful learning (Spagnolo 1996).

Anticipated Benefits to Illinois Schools from Project Linc~On

Clearly, if schools are not "plugged in" to the new telecommunications technologies, teachers and students will be unable to access the vast amounts of information and interactive resources otherwise available at their fingertips. As Project Linc~On continues to be established across the state, public school districts will be provided with the following:

- Open ports which permit connection to a high capacity statewide information backbone
- Web space on centrally located Web servers for educational purposes
- A high-speed system which uses strategically located caching Web servers and FTP (file transfer protocol) servers
- Direct access to state provided on-line services
- The statewide intra-net to provide for secure electronic data transfer
- E-mail accounts for school staff to use for educational purposes (Spagnolo 1996).

Combined with other local and state technology initiatives, Project Linc~On moves Illinois public schools closer to equitable and affordable access to Internet and World Wide Web (WWW) resources. In addition to these initiatives, successful efforts have been undertaken by ISBE to acquire and distribute state and federal grant dollars to upgrade local

[1] The authors are Assistant Dean, College of Education and Human Services, and Professor, Department of Educational Administration, Western Illinois University, Macomb, IL. Layout by JoAnn Kennedy.

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schools' infrastructure as well as to improve teacher skills in using new technology tools. In recent years, millions of grant dollars have gone to Illinois schools as a result of funding for Goals 2000, Technology Literacy Challenge Fund, Scientific Literacy, Museum in the Classroom, Illinois Spin, and related projects. These include equipment and technology planning grants specifically targeted to some of the state's most economically depressed rural districts. Likewise, the establishment of Learning Technology Hubs throughout the state has assisted schools in long-term technology planning, Internet connectivity, and coordination with the regional offices of education for technology-focused staff development.

Six Essential Learnings in a Technological Society

As advanced technology resources become more prevalent in Illinois schools, it is vital that teachers and students develop new roles in learning, living, and working in an increasingly complex and information-rich society. In 1995, the Illinois State Board of Education (1998) articulated the "Six Essential Learnings in a Technological Society." As Illinois teachers become adept in using technology tools for teaching and learning, the following are essential standards for integrating the new tools of learning into classroom instruction. They also serve as fundamentals in the work of the ISBE to develop content standards, performance standards, and assessments for all academic areas in the K-12 curriculum:

1. *The student as information seeker, navigator, and evaluator.* The student recognizes and values the breadth of information sources, browses those sources, and differentiates and selectively chooses sources based on soundness and relevancy. The student retrieves appropriate information/ data using all forms of electronic/optical media, technology, and telecommunications.

2. *The student as critical thinker, analyzer, and selector of information and technologies appropriate to the task.* The student uses problem-solving techniques and technology tools to review information and data from a variety of sources; analyzes, synthesizes, and evaluates it; and then transforms the myriad of ideas, data, and information into useful information and knowledge. During this process, the student discriminates among a variety of technologies and electronic/ optical media to extend and expand his or her capabilities.

3. *The student as creator of knowledge using information resources and technology.* The student, both individually and as a successful member of a team, constructs new meaning and knowledge in all content areas. Different types of information are combined and synthesized through technology, telecommunications, and computer modeling/simulations.

4. *The student as effective communicator using a variety of appropriate technologies/media.* The student creates, produces, and presents ideas, stories, and unique representations of thoughts through a variety of electronic/ optical media by analyzing the immediate task and the technology tools available. The most effective tool(s)/media for the purpose and audience are selected.

5. *The student as a technologist.* The student develops the confidence, competence, information management strategies, and sufficient technical skills to successfully install, set up, and use the technology and telecommunications tools in daily life, work situations, and learning environments.

6. *The student as a responsible citizen in a technological age.* The student understands the ethical, cultural, environmental, and societal implications of technology and telecommunications, and develops a sense of stewardship and individual responsibility regarding use of technology, media, and telecommunications networks.

The promise of Internet connectivity and high capacity bandwidth with rapid access to the World Wide Web through Project Linc~On will empower Illinois teachers to fully integrate the six essential learnings as a regular part of classroom instruction. Through access to the vast resources on the Web, teachers in Web-supported classrooms are able to do the following:

- Take students on electronic field trips
- Clarify and expand new information learned each day in the classroom
- Design lesson plans and enrichment materials in support of the Illinois learning standards
- Arrange for students to participate in collaborative projects with students from other schools across the state, from out-of-state, and in foreign countries
- Open students up to the massive collection of informational resources regularly being added to the Internet.

The World Wide Web and Virtual Learning Communities

The World Wide Web consists of connected computer servers and computer clients that communicate with each other using a common set of communication protocols. The WWW interconnects a variety of information sources through hypertext or a hypermedia link that allows different types of computers to "talk" to one another. Computer protocols permit a *client* computer to retrieve text, pictures, sound, video, software, and other types of files from a *server* computer (Cotton 1998).

The medium for this exchange of information among computers is the Internet. The Internet is a highly disorganized network of computers that represents the collective efforts of many organizations, institutions, and individuals operating independently and contributing to the network whatever they think is useful. The WWW is the means by which Internet resources can be organized by protocols for information access and exchange. The advantage to students and teachers is that someone else has already done the work of locating and organizing meaningful collections of Internet resources (Grabe and Grabe 1996).

In order for users to locate and retrieve this wealth of organized information, special software called a Web browser is needed that understands the Internet's communication protocols. Web browsers are computer programs that must be loaded onto those computers connected to the Internet and intended for use on the WWW. For the most part, browser programs have been available at no cost to educators and can be downloaded free from the Web. Two popular browsers and their Web addresses are Netscape <http://www.netscape.com> and Microsoft <http://www.microsoft.com>. The software for either program is also available for purchase at most computer outlets.

Connectivity to the Internet no longer restricts instruction to the four walls of the classroom. Via the WWW, teachers and students can form learning communities that extend far beyond the classroom or other boundaries such as the geographical isolation common to many rural schools. These virtual communities of learners emerge by means of the WWW wherever a group of learners, in different locations, carry on public discussions with sufficient human interaction to form learning relationships in Cyberspace. Teachers and students in virtual learning communities use words and images on a screen to exchange greetings, engage in intellectual discourse, conduct meetings, share knowledge, offer emotional support, make plans, brainstorm ideas, learn about other cultures, and otherwise broaden horizons. In fact, they do much of what others do in traditional classrooms, but they do it online and thereby extend the community of the classroom into the community of the world (Norton and Wiburg 1998).

Useful Web Sites for K-12 Educators

The URLs (Universal Resource Locators) which follow have been identified by educators as among the best educational sites on the Web. Some contain complete lesson plans while others offer ample information to tailor personalized lessons according to a teacher's own style. The sites below are organized into eight different categories: (1) General K-12 Resources, (2) State and Federal Education, (3) Science and Mathematics Resources, (4) Language Arts Resources, (5) Cultural and Language Resources, (6) History and Social Science Resources, (7) Museum Sites on the Web, (8) and Schools on the Web. Most of the sites are free and have been selected from *The Online Classroom: Teaching with the Internet* (Cotton 1998, pp. 24-55).

General K-12 Resources on the Web

A Teacher's Place
<http://pluto.njcc.com/~harris>
Peter Harris, a teacher and computer specialist at Robbins Elementary School in Trenton, New Jersey, has designed this page. Resources on this site include educational associations, teacher's guide for parents, teacher resources, cooperative education, gifted and talented, Internet and education, kid's advocates, literature and storytelling, theater, math, science, special needs, and student exchange programs.

Carrie's Crazy Quilt — Sites for Educators
<http://www.mtjeff.com/~bodenst/pages5.html>
An all-purpose site that offers curriculum resources in almost every area of study, including resources in general education, counseling and guidance, humanities, social science, science, math, Internet, and vocational and technical training. Carrie is a high school teacher who has created an easy-to-access Web page with a wide range of topics.

Classroom Connect
<http://www.classroom.net/>
Created by Wentworth Worldwide Media, Inc., this site has links to all of Wentworth's vast Internet resources, including their newsletter, list of K-12 resources, and lesson plans. Creators of this site are highly committed to use of the Internet as a teaching resource and regularly offer suggestions to teachers for Internet integration into the classroom.

Cool School Tools
<http://www.bham.lib.al.us/cooltools/>
Created by Birmingham, Alabama, schools, this site is an index designed specifically for children and teens. The index is easy to follow and includes categories such as general resources, philosophy and psychology, religion, social science, language, natural sciences and mathematics, technology, the arts, literature and rhetoric, and geography and history.

EdCentral Home Page
<http://www.ehhs.cmich.edu/>
Provided by Central Michigan University, this site claims to be the "Communication and Resource Center for Professional Educators." The site's three major areas are (1) education central, (2) the educational environment, and (3) focus on the profession.

Kathy Schrock's Guide for Educators
<http://www.capecod.net/schrockguide>
Kathy Schrock has been working on this site for years. She includes resources for almost every curriculum area, easy-to-find search engines and directories, lessons about using the Internet, and more.

K-12 Sources — Curriculum — Lesson Plans
<http://execpc.com/~dboals/k-12.html>
The directory on this site has everything from the Virtual Frog Dissection Kit to music. The major purpose is to encourage the use of the WWW as a tool for learning and teaching and to provide help for K-12 classroom teachers in locating and using Internet resources in the classroom.

Kid's Web
<http://www.npac.syr.edu/textbook/kidsweb/fastindex.html>
The home page of this site is a table of contents with listings in four general areas: (1) arts, (2) sciences, (3) social studies, and (4) miscellaneous. Each area has subcategories. Also listed are links to digital libraries, other collections of Web sites for kids, and a list of some of the K-12 schools with Web-based projects on the Internet.

Live Text: Institute for Learning Technologies — Topics List
<http://www.ilt.columbia.edu/k12/livetext/topics/>
Columbia University Teachers College created this guide to help initiate experienced educators into designing constructive cooperative learning projects revolving around use of the WWW. Topics range from acceptable Internet use policies to writing in the curriculum.

NetLearning: Why Teachers Use the Internet
<http://www.songline.com/teachers/index.html>
This site is for teachers who want to foster online learning for their students. The focus is on how to teach with the Internet. There is also useful information about acceptable use policies, Internet filtering or censoring programs, educational technology, grant resources, online projects, and student publications, as well as resources on animals and insects, geography, the arts, government, languages, literature, math, and science. There is also a "Top Ten List" of reasons teachers use the Internet.

The New Jersey Curriculum Home Page
<http://njnie.dl.stevens-tech.edu/curriculum/currichome.html>
This is a Web page of projects designed by a team of New Jersey educators. The collaborative projects all focus on using real-time data available from the Internet and deal with topics ranging from global weather conditions, variations of the boiling point of water around the world, ocean research, weather conditions, plate tectonics, architecture, and more. It also includes a useful directory for teachers who want their students to connect to peers and experts from around the world.

Pacific Bell Blue Web'n
<http://www.kn.pacbell.com/wired/bluewebn/>
Pacific Bell has collected some of the best lesson resources for activities and projects available in science, English, math, history, art, and business. The resources on this site have been screened using a rubric found at <http://www.kn.pacbell.com/wired/bluewebn/rubric.html>. This is a useful rubric for evaluating Web-design work produced by students.

Sholom's Resources for Students and Teachers
<http:www.interlog.com/~sholeise/ResourceTables.html>
This site has resources for students in the areas of education, humanities, the sciences, computer technology, mother earth, and miscellaneous. It operates with an easy-to-use matrix that students seem to like.

Steve and Ruth Bennett's Family Surfboard
<http://www.familysurf.com/>
Two parents created this site to help other parents enjoy the fun of educational computing with their children. There is information about good sites for kids, many online activities, and a forum on how families with children can deal with computing issues.

Teachers Helping Teachers
<http://pacificnet.net/~mandel/index.html>
The purpose of this site is to (1) provide basic teaching tips that inexperienced teachers can immediately implement in the classroom, (2) provide new ideas in teaching methodologies for all teachers, and (3) provide a forum for experienced teachers to share their expertise with colleagues around the world.

The Teacher's Desk
<http://mycroft.mexia.com/~judihar/tdesk2.html>
Judy Hardison is the creator of this site developed for teachers. She has an unusual sense of humor and offers her own twist on the traditional curriculum and how to use the Internet to enhance it.

The Teacher's Resource Page
<http://www.geocities.com/Heartland/4251/teacher.html>
There are many teacher resource pages on the Internet, but this one is particularly interesting in that it contains links to national education organizations, child safety, filtering programs, peace studies, character education, creative writing, folk tales from around the world, and others. It is a varied and useful collection of Internet resources for teachers.

Web Sites and Resources for Teachers
<http:///www.csun.edu/~vceed009/>
Vicki and Richard Sharp are teachers at California State University, Northridge, who have collected Web sites and put them into eight categories: language arts, social studies, math, science, art, music, just for kids, and ESL/bilingual. When clicking on one of the categories, an annotated list of Web sites related to that topic appears.

Web66: A K-12 World Wide Web Project
<http://web66.coled.umn.edu/>
Web66 is supposed to conjure up thoughts of Route 66 by giving a virtual tour of what's available for teachers on the Internet. The College of Education at the University of Minnesota houses the site with topics in education, technology, and information.

State and Federal Education Web Sites

Illinois State Board of Education
<http://www.isbe.state.il.us/>
ISBE's site has Illinois curriculum frameworks, legislation that impacts schools, and links to lesson plans. Specific categories listed include communications and external relations; governmental relations; regional offices of education; ISBE services; accountability and quality assurance; business, community, and family partnerships; educational innovation and reform; school financial services; learning technologies; policy, planning, and management; and ISBE resources.

U.S. Department of Education
<http://www.ed.gov/>
The federal government education site includes national education goals, access to federal education guidelines, national education initiatives, federal grants, and the latest information about bills going through Congress that impact education. Links are also provided to each state office of education.

Science and Mathematics Resources on the Web—General Resources

The Discovery Channel School
<http://school.discovery.com/>
Every semester this site offers several lessons for teachers to use with students that address timely topics and issues.

The Eisenhower National Clearinghouse for Math and Science
<http://www.enc.org/nf_index.htm>
This site lists activities for use in the classroom that have been written by teachers for students, and includes best school sites and Internet tools for parents.

Frank Potter's Science Gems
<http://www-sci.lib.uci.edu/SEP/SEP.html>
Frank Potter and Jim Martindale mine the Web to find the best science sites for teachers. The collection consists of more than 2,000 sites, with more being added on a regular basis. The sites are annotated and categorized according to grade level.

The Why Files: The Science Behind the News
<http://whyfiles.news.wisc.edu/>
This online newspaper tries to explain the science behind the news headlines. The focus is on sports and science, with a question/answer forum.

Useful Science Web Sites
<http://www.hkstar.com/~hkiedsci/de-web.html>
This is a Hong Kong site which includes 24 links to other science sites. It has a digital electronics link with a tutorial lesson for high school electronics.

Science and Mathematics Resources on the Web—Planets and Space Sites

NASA Home Page
<http://hypatia.gsfc.nasa.gov/NASA_homepage.html>
NASA offers a wealth of information for teachers and students, including information on recent and ongoing space probes such as the Mars and Jupiter explorations.

The Messier Science Page
<http://seds.lpl.arizona.edu/messier/Messier.html>
From 1758 to 1782, French astronomer, Charles Messier, compiled a list of a hundred diffuse objects in space that he thought were comets. As it turned out, these objects proved to be nebulae, star clusters, and other beautiful objects found in the night sky. The study of these objects by astronomers has led to important and incredible discoveries such as the life cycles of stars, reality of galaxies, and the possible age of the universe.

The Nine Planets: A Multimedia Tour of Our Solar System
<http://seds.lpl.arizona.edu/billa/tnp/>
At this comprehensive examination of our solar system, teachers and students will find links to just about everything now known about our nine planets, moons, orbits, the Hubble telescope, and its photos of outer space.

Ocean Planet Home Page
<http://seawifs.gsfc.nasa.gov/ocean-planet.html>
This Smithsonian exhibit looks at the power of the ocean and, according to the site's opening comments, "plumbs the depths of the watery world."

Stars and Galaxies
<http://www.eia.brad.ac.uk.btl/sg.html>
This site explains how stars and galaxies behave, their origins, life cycles, and how they generate energy.

Science and Mathematics Resources on the Web—Life Science Sites

The Heart: An Online Demonstration
<http://sln2.fi.edu/biosci/heart.html>
This site provides lesson material about the heart and the circulatory system. It is geared to upper elementary-age children.

Science Learning Network
<http://www.sln.org/>
This site is devoted to scientific inquiry and contains lessons about water, hurricanes, the wind, and the cow's eye dissection.

The Cow's Eye Dissection
<http://www.exploratorium.edu/learning_studio/cow_eye/>
Along with a step-by-step lesson on the anatomy of a cow's eye, there is a short audio introduction with laughing kids and statements such as "gross." The purpose of this anatomy lesson is to learn more about how the eye works.

The Visible Human Project
<http://www.nim.nih.gov/research/visible/visible_human.html>
The idea of this project is to create a three dimensional view of the human body—male and female. The site also includes a Medline for health information.

Virtual Frog Dissection Kit
<http://george.lbl.gov/ITG.hm.pg.docs/dissect/info.html>
The University of California at Berkeley and the Lawrence Livermore Labs offer a good way to study the anatomy of a frog without having to breath formaldehyde or handle a dead amphibian. The Dissection Kit is a virtual reality application to classroom learning.

Science and Mathematics Resources on the Web—Pre-History Sites

Honolulu Community College Dinosaur Exhibit
<http://www.hcc.hawaii.edu/dinos/dinos.1.html>
Although dinosaurs never lived in Hawaii, this museum exhibit has pictures of dinosaurs as well as a guided audio tour.

Archeology Resources
<http://www.interlog.com/j~jabram/elise/archmenu.htm>
This site allows students to participate in a virtual archaeological dig.

Science and Mathematics Resources on the Web—Sports Science Sites

The Science of Hockey
<http://www.exploratorium.edu/hockey/>
This site uses video clips and interviews with scientists and hockey players to learn more about hockey, facts about ice, mechanics of skating, reaction time, shooting a puck, and human energy associated with the game.

Science and Mathematics Resources on the Web—Math Sites

Math Online
<http://www.kqed.org/fromKQED/Cell/math/mathmenu.html>
Sponsored by the Corporation for Public Broadcasting, this site consists of lessons, news and current events, and related learning resources that integrate math into many aspects of the curriculum.

Fractals
<http://math.rice.edu/~lanius/frac/>
Cynthia Lanius has designed a fractals unit for elementary and middle school math students that is both fun and informative. A related site is the Fractal Microscope at <http://www.ncsa.uluc.edu/Edu/Fractal/Fractal_Home.html>. These two sites complement each other.

The Math Forum Home Page
<http://forum.swathmore.edu/index.js.html>
Located at Swathmore College, the Math Forum is a compendium of lists for students, teachers, and researchers. It features what is new and exciting in the world of mathematics.

The Math Virtual Library: General Resources
<http://euclid.math.fsu.edu/Science/General.html>
The site has over 60 math and science links.

The Pi Page
<http://www.ccsf.caltech.edu/~roy/pi.html>
Everything you ever wanted to know about Pi, including the first 50,000 digits of Pi is on this site. There is also a section on the uselessness of Pi.

Welcome to Mega-Math
<http://www.c3.lanl.gov/medga-math/menu.html>
The Los Alamos Lab has devised and collected Web sites that help explain mathematical phenomena such as graphing, machines, infinity, knots, and ice cream.

Language Arts Resources on the Web—General Collections Sites

The Children's Literature Web Guide
<http://www.ucalagary.ca/~dkbrown/index.html>
The site offers a variety of links to good children's literature for teachers, parents, storytellers, and kids.

Electronic Resources for Youth Services
<http://www.ccn.cs.dal.ca/~aa331/childlit.html>
This is a literature Web site with online links to children's books. The site starts with a HyperText list that points viewers to various aspects of children's literature.

Fairrosa CyberLibrary
<http://www.users.interport.net/~fairrosa/>
This is a list of links that leads to classics, fairy and folk tales, stories and rhymes, and magazines. A collection of Lewis Carroll's works also resides at the site.

Roget's (1911) Thesaurus
<http://www2.thesaurus.com/thesaurus/>
The 1911 version of *Roget's Thesaurus* is online.

Language Arts Resources on the Web—Specific Collections

Alan Eliason's Mark Twain Library
<http://cadswes.colorado.edu.twain/>
The site consists of several books, short stories, and narratives written by Mark Twain, as well as memorabilia about him.

Candlelight Stories
<http://www.CandlelightStories.com/>
This is a collection of stories from all over the world. Some are old favorites and familiar fairy tales; others are new additions which have been written by kids.

Animals, Myths and Legends
<http://www.ozemail.com.au/~oban/>
This site, a collection of recently written myths and legends that look at the relationship between man, animals, and the universe, is recommended for children 3-8 years old.

Greek Mythology
<http://www.intergate.net/uhtml/.jhunt/greek_myth/greek_myth.html>
This is one of several collections of mythology on the Web. This one is a relatively comprehensive collection of Greek myths appropriate for use with intermediate and middle grade students.

Tales of Wonder: Folk and Fairy Tales from Around the World
<http://it.ucdavis.edu/richard/tales/>
This site contains tales from Africa, Central Asia, Central Europe, China, England, India, Ireland, Japan, the Middle East, Native America, Russia, Scandinavia, Scotland, and Siberia. A good site to compare and contrast stories from different cultures.

Cinderella Stories
<http:/www-dept.usm.edu/~engdept/cinderella/inventory.html>
This site contains twelve versions of the Cinderella story written from 1729 to 1912. Students can compare and contrast the stories to analyze the fairy tale through different periods of history.

Shakespeare Headquarters
<http://the-tech.mit.edu/Shakespeare.html>
The site offers complete copies of comedies, tragedies, sonnets, and poems, along with an interactive glossary. When students or teachers are reading the text and come across a word they do not understand, they can click on it and the glossary appears to define the term.

Language Arts Resources on the Web—Places To Publish Student Works

Kid's Space
<http://www.kids-space.org/>
The site is rated "G" according to the banner across the top of the page. It serves as a place where kids can show off their writing, painting, and thinking to others—a place where students can publish their creative work.

KidPub WWW Publishing
<http://www.kidpub.org/kidpub/>
A popular site for elementary age students for electronic publication of student written work.

Cultural and Language Resources on the Web

Human Language Page
<http://www.June29.com/HLP/>
This site contains information about almost every language spoken on earth and some which are no longer spoken. Site visitors might check out some of the easier languages such as Spanish or French, then seek to learn more about Croatian, Basque, Afrikaans, or others of interest.

World Cultures
<http://info.pps.pgh.pa.us/k12/culture.html>
The site contains links to a sizeable number of other sites dealing with various aspects of human cultures: world culture, African-American, Asian, and European, as well as libraries and exhibits of cultures around the world, and virtual visits to cultural locations around the world.

History and Social Sciences Resources on the Web—General Resources

History Social Science K-12 WebPage
<http://www.execpc.com/~dboals/boals.html>
Devoted entirely to history and social sciences, this site contains links to hundreds of school-age appropriate sites across the Web.

Social Studies Lesson Plans for Teachers
<http://www.csun.edu/%7Ehcedu013/index.html>
A site with social studies teachers in mind. It offers links to lesson plans, resources, online activities, and current events.

The Social Studies Page
<http://howww.ncook.k12.il.us/docs/scstd.html>
A big site with links to economics, geography, government, history, and people. It includes a link to the *CIA Fact Book* as well as a tour of the Grand Canyon and Nepal.

Teaching Material for Historians
<http://grid.let.rug.nl/ahc/teaching.html>
The site contains links to the American Revolution, the Jewish Holocaust, archaeology, and other subjects of historical interest.

History and Social Sciences Resources on the Web—Specific Resources

1492 Exhibit
<http://sunsite.unc.edu/expo/1492.exhibit/Intro.html>
This is a Library of Congress exhibit that follows the 1492 voyage of Christopher Columbus, including maps and graphics.

American Civil War Home Page
<http://funnelweb.utcc.utk.edu/~hoemann/cwarhp.html>
This site has been very popular with middle school teachers. It includes time lines, maps, documents, diaries, pictures, and other primary resource materials for teachers to aid in lesson planning.

American Revolution to Reconstruction
<http://grid.let.rug.nl/~welling/usa/revolution.html>
This site is part of a series on American history, which contains a variety of materials for use by teachers. Since 1994, this site has received over one million visitors.

Welcome to the Civil War Center
<http://www.cwc.lsu.edu/>
This site has more than 1,000 links to information about the bloodiest war in American history. The site has movie and audio clips as well.

The Invention Dimension
<http://web.mit.edu/invent/>
An interesting site for young people who enjoy finding out about inventors and stories behind the inventions. A new inventor is featured each week.

MapQuest
<http://www.mapquest.com/>
The site has map directions to just about anywhere in the world from the address of one's home to almost anywhere else. Exact directions are identified and appear on the screen in a matter of a few seconds or less.

The Teaching Learning Web
<http://www.usgs.gov/education/learnweb/index.html>
A set of lessons developed by the U.S. Geological Service that deals with global change, maps, and earth science.

National Flags
<http://155.187.10.12/flags/nation-flags.html>
This site has images of flags from Argentina to Zambia, with new flags being added on a regular basis.

National Geographic Online
<http://www.nationalgeographic.com/main.html>
More than an advertisement for the magazine, this site has resources and collections for teachers and students. Of interest is a well-produced documentary-based page.

Women in World History Curriculum
<http://home.earthlink.net/~womenwhist/index.html>
A well-maintained site full of interactive information and resources about women's experiences in world history. It is for teachers, students, parents, and those interested in history.

Suffrage History
<http://www.pbs.org:80/onewoman/suffrage.html>
Mostly a text-based site which tells the history of women's suffrage. It includes information about PBS and educational pages related to all PBS shows.

Museum Sites on the Web

The Art Institute of Chicago
<http://www.artic.edu/aic/firstpage.html>
View some of the more than 300,000 works of art in ten different departments through this site. The museum houses a fine collection of Japanese woodblock prints as well as the most extensive American arts collection anywhere.

Metropolitan Museum of Art
<http://www.metmuseum.org/>
More than two million works of art reside at one of the largest art museums in the world. The collection spans more than 5,000 years of world culture, from prehistory to the present.

Resources at the Smithsonian
<http://www.si.edu/resource/start.htm>
The nation's museum is open by clicking on this site.

The San Francisco Museums of Fine Art
<http://www.thinker.org>
The San Francisco Museum is committed to putting all of its collection online, along with detailed information about the museum's works of art.

Treasure of the Czars
<http://www.times.st-pete.fl.us/Treasures/Default.html>
This site has Romanov artifacts. The exhibition first came to The Florida International Museum in 1995. It was so popular that the Web site was kept open under an exclusive contract with the Moscow Kremlin Museums.

The Louvre
<http://www.louvre.fr>
Most would consider this the most famous art museum in the world, with works by many of the masters.

Schools on the Web

Vose School Educational Resources
<http://www.teleport.com/~vincer/starter.html>
A home page designed and maintained by a school that has more resources than most would ever have time to use. Contains screens full of information of what teachers and students are doing on the Web. Lesson plans, work by kids, ideas than can be adapted in other classrooms, and more are here.

The American School Directory
<http://www.asd.com/>
Contains information on nearly any school in the United States.

Webb66 International WWW School Registry
<http://web66coled.umn.edu/schools.html>
Many schools that are online are listed on this Web site. Teachers can add their school to the site and can browse the home pages of other schools for ideas about lessons and activities on the Internet.

Strategies for Teaching and Learning on the Internet

Using the Internet as a teaching/learning tool permits interactive and nonlinear navigation by students through learning materials that stimulate the sight, sound, and cognitive reasoning. Use of the Internet promotes student application of the "Six Essential Learnings in a Technological Society" espoused by the Illinois State Board of Education. Via the World Wide Web, students and teachers can access hypermedia online learning resources at any time, day or night. Learning strategies adapted to K-12 applications for WWW use in the classroom include a variety of activities (Harris 1995). A brief description of these activities, summarized from the Web, follows:

- *Informational searches* are described as activities where students are given clues and must use resources, either on or off the Internet, to solve the problem.

- *Electronic process writing* involves having students post their written work, such as poems or essays, to a user group so others can provide feedback.

- *Sequential creations* are projects that are "added to" by others as the work progresses. An example might be a poem about world peace that "virtually" travels to many locations, and from one class to another, until it grows quite lengthy.

- *Parallel problem solving* involves having students in several locations work on solving the same problem. The students electronically share their findings, methods, and analysis.

- *Virtual gatherings* can be of two types. In one method, students from different geographic locations gather electronically to discuss a problem or question. Another form involves students from several locations meeting simultaneously for a certain purpose. These meetings may be planned or organized using the Internet.

- *Simulations* require students to access sites that create the virtual worlds that they will explore. Successful activities have included frog dissection, cow's eye dissection, climate modeling, molecular configuration, and plant growth modeling.

- *Social action projects* include items such as fundraising, ecology projects, and issues awareness, wherein the Internet is the telecommunications medium for bringing people together for social action-oriented humanitarian activities (McDowell 1995).

Guidelines for Successful Classroom Instruction Using the Internet

Successfully managing student learning in Internet-connected classrooms requires extra attention and planning on the part of teachers to help assure that learning activities are maximized by students. The following suggestions for successful practice are taken from Cotton (1998, pp. 66-67).

- Develop a rationale or purpose as to why the lesson or unit is important and why it is important to use the Internet. This is essential for both your students and their parents to know.

- Create lessons that use a variety of resources, such as offline books, encyclopedias, dictionaries, journals, magazines, and atlases, as well as the Internet. To be prepared for the future, these students will have to know many different ways to access information.

- Have clear objectives for each unit of Internet-based instruction and discuss them in detail with your students prior to starting.

- Demonstrate the lesson to your class before you send them off to work online. This will clear up any confusion that might occur, as well as reduce the amount of wasted online time that can happen when instructions are not clear.

- Discuss each aspect of the lesson in detail so your students know what to expect and what they have to do in order to learn the content.

- Have your students develop a "Web Site Log," telling about the sites they have visited and what they learned from them. Keep your students accountable and keep them writing. Writing, discussing, and reflecting are three keys to learning.

- Create lessons that have a "set" at the beginning and "closure" at the end. The set creates extra interest in the lesson; the closure allows for some type of "products" to be shared with the group.

- Bookmark three to five URLs for each lesson beforehand, so your students will have an idea of where they are expected to go on the Web.

- Create specific worksheets or exercises for URLs to keep your students accountable.

Conclusion

The key to the Internet is its telecommunications capability. The Internet is about communicating with other people. While some skeptics may criticize the computer as a form of depersonalized learning, Internet-connected computers actually do more to put learners in contact with other learners, and people with people, than any other telecommunications medium available. The Internet promotes the concept of a community of learners, not only in the traditional classroom, but beyond the classroom in virtual learning communities with global connections as well.

As educators move into the year 2000 and beyond, Illinois students need to develop skill and expertise in accessing, exchanging, and analyzing digital information resources if they hope to be successful in the workplace and world of the future. Without a doubt, they need exposure to today's telecommunications tools in order to master the knowledge and the technology that will make them prosper. If the technology of the printing press and books revolutionized learning in the 15th century, it will be the technology of the computer and the Internet which revolutionizes learning in the 21st century. As the Internet evolves to its full potential, and students and teachers gain skill in navigating through its databases and services, the information of the world will truly be at their fingertips and before their eyes.

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